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Device for printing on a medium

[Translated from German]

Translation requested by: Betsy A Warner (for Packaging Systems Division)

Translation provided by: Maiken Heim

Tel.: (651) 733 0848

E-mail: mheim@mmm.com or maikenhe@aol.com  
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**Description**

[0001] The present application concerns a device for printing on a medium, and especially a device for printing on a medium having a sending and/or receiving device. The present invention concerns especially a device for printing on a label equipped with a transponder unit.

[0002] In the area of manufacturing of printed-on media, especially labels, numerous printing devices are known, which make labels depending on the given information/data, which is printed on with a print desired by the user. In case of such printers a label in form of a roll is added to a printer, which prints the desired information onto the label. Conventionally, labels are formed by a double-layered material, where after printing the label can be removed from a carrier layer in order to stick it onto relevant products or the like.

[0003] The disadvantage of those known devices, also are known as label printers, is that only already predetermined information can be printed, which appear in clear (text), containing no machine readable, automatic capture (recording) of specific information concerning the product on which the label shall be mounted on.

[0004] For solving this problem, it is known in the state of the art that so-called label printer are designated which print onto the label in addition to the label text a so-called bar code, which contains coded and machine readable information. The disadvantage of those known systems is that it is not possible to change the information saved in the bar code concerning the product after printing of the label, and in addition, it is impossible to change information or save additional information onto such a label.

[0005] It is known in the state of the art that for solving this problem labels have to be used which are equipped with a transponder which can be written on or read from, respectively, by using an appropriate write/read-device. EP 564 051 A1 for instance describes an identification card, in which a transponder unit is embedded/let into the plastic, by which an information exchange between a write/read-device and the chip on the card can be carried out. From DE 196 01 358 for instance a piece of paper is known, into which an internal wiring (connection/switching) is embedded, that can be read from or written onto by means of an appropriate read/write-device.

[0006] The disadvantage of those solutions known by the state of the art is that after providing the medium with the integrated transponder unit, the label is first of all printed on in the conventional way with a conventional printer, like described above for instance. After finishing the label with the desired imprint it is necessary in a consecutive step to feed the labels into an appropriate device, equipped with a write/read-instrument, in order to read the corresponding information from the label, or to store it in there, respectively.

[0007] Therefore, it is first of all necessary to feed the already finished labels into an additional device, adding an additional time-consuming step to the total manufacturing process for the labels. Furthermore, only at the time when labels are fed into an additional device, it can be seen to what extend the transponders used in the individual labels are in working order at all, so that just by than it turns out how many labels have possibly to be redone (repaired), and have to be fed into the read/write-device again.

[0008] Based on this state of the art the present invention is based on the task to create a simplified device to print on a medium, in which in a simple way a transponder, present in the medium, can be written on with the necessary information and at the same time it can be tested if the transponder and the label to be made works at all.

[0009] This task is solved by a device according to claim 1.

[0010] The present invention creates a device for printing on a medium, having a sending and/or receiving device with

- a printer printing onto the medium depending on the received print data; and
- a read- and/or write-device communicating with a sending- and/or receiving device inside the medium

[0011] Compared to the above described known labeling printers from the state of the art, the present invention has the advantage, that a single/individual device is created, which delivers ready-to-go, directly usable labels, e.g. able to read the necessary information in or from a transponder, respectively.

[0012] Furthermore, another advantage of the current invention is that it be automatically determined if the transponder functions/works or does not for a label to be made, what is going to be captured in a simple way by the device, so that it can be ensured that the correct number of desired labels can be made without intermediate action.

[0013] In accordance with a preferred design example of the present invention, the write/read-device for the transponder is placed between an exit of the printer and a reservoir device, containing the medium to be printed on, in order to determine if the used transponders are in working order.

[0014] If that is not the case, the printer e.g. can be steered in order to avoid printing onto a malfunctioning transponder label. This is a simple way to allow to distinguish functioning- from non-functioning labels, and at the same time money can be saved, which is especially of interest in the case of ink jet printers or laser printers and at a high number of labels to be made, since in that case one can avoid the unnecessary use of ink or toner.

[0015] Preferred further developments of the design are defined in the sub-claims.

[0016] Following a preferred design example of the present invention is described in more detail by means of the added drawing. It shows:

Fig. 1 a schematic diagram of the device according to the invention and according to a preferred design example.

[0017] Fig. 1 shows a design example according to device 100 in accordance with the invention, containing a printer 102 as well as a write- and/or read-device 104, which are placed in a housing 106 of device 100. Furthermore a reservoir device 108 is intended in form of a roll, onto which the medium 110 to be printed on is placed. Using corresponding, only schematic drawn mechanical bearings and driving devices 112, 114 the necessary movement of reservoir roll 108 is accomplished. As can be seen from the figure, the medium to be printed on 110 is led away from the reservoir roll 108 towards the printer 102, where it is printed on and delivered from, while a so called donation device 116 is assigned to the printer 102, causing medium 110, which is formed as a double-layer according to the design example, being divided into a label 118 and a carrier material 120, where in this context the label is mounted for instance with an adhesive layer on the carrier material 120, from which it can be peeled off in order to be mounted onto predetermined products or the like.

Medium 110 has a sending- and/or receiving device, which is not shown in the drawing, and which can be for instance a transponder unit embedded into the label. The write- and/or read-device 104 of the device according to the invention 100 communicates with the sending- and/or receiving device (transponder) in medium 110.

[0018] According to the present invention, an antenna 122 of the sending- and/or receiving device 104 is placed between a printer exit 102, to which for instance the sending device 116 is attached, and the reservoir roll 108.

[0019] In the design example shown in Fig. 1, the antenna 122 is located next to the medium 110, in order to ensure the corresponding communication between antenna 122 and the transponder in medium 110. The antenna 122 is placed between the reservoir 108 and the printer 102 in order to ensure that already prior to printing on medium 110 one can realize if the build-in transponder is working properly, while depending on the result of the recording/capturing the medium 110 is printed on or not, respectively.

[0020] According to another, not shown design example of the present invention the antenna 122 is located between printer exit 102 and a printer head of the printer 102, e.g. between the sending device 118 and the printer head of the printer 102. This design/arrangement has the advantage that during printing of individual labels no missing places, i.e. missing labels, occur. The printer 102 is still able to print a corresponding address on a defect transponder in a medium, since the medium can be re-called/withdrawn as long as the label is not completely removed from the carrier. This process is controlled by means of a corresponding, precise tuning of printer control and write- and/or read device.

[0021] Beside the elements described earlier, device 100 shows furthermore a printer control 124, which, in the shown design example, stays connected both with the printer 102 as well with the write- and/or read device 104, as indicated by the corresponding arrows between the elements 102, 104, and 124. Data exchange occurs via those junctions between the printer control 124 and the printer 102, and between the

printer control 124 and the device 104, in the given design example allowing for an information flow in two directions, while it is sufficient to allow data exchange in one direction only, depending on the desired configuration.

[0022] The printer control 124 contains furthermore a printer data junction 126, which receives and/or sends data, while printer data can be received via/over the junction 126 and the printer control 124, which are then transferred to the printer, which prints onto the medium depending on the received data.

[0023] Besides receiving the printer data, the required data can also be exchanged via the printer junction 126 between a main device and the device 104.

[0024] In another, not shown design example an additional junction can be provided for instead of junction 126, which is assigned to device 104, and being in direct connection (contact) with an external device, so that in this case only data concerning the printer control is sent (run) over the junction 126, and the necessary data or data exchange, respectively, between device 104 and an external device occurs via the junction assigned to device 104.

[0025] The necessary data exchange between an external device and the device according to this invention occurs via the junctions, independent if only one or several junctions are existing (present), while the data necessary for printing onto the label are delivered to the printer 102 via the junctions, and also for instance the necessary data, which should be read into the transponder, can be received. Likewise, certain error signals or other control signals received by or sent to device 100, so that for instance by reading a specific (corresponding) signal the external device can see how many faulty (defective) transponders were present, and at the same time, in this context the total number of all perfect labels can be shown (indicated).

[0026] With regard to medium 110 it has to be emphasized that the drawing presented in Fig. 1 is only of schematic nature, and that the medium 110 is arranged in form of a continuous band (belt), while the medium 110 is sub-divided into segments which define the labels, and those segments are each equipped with an imbedded transponder.

[0027] The antenna 122 can be arranged as a separate part in a band/belt guide, which guides the medium 110 from roll 108 to the printer 102. The antenna area of the antenna 122 is chosen in such a way that it has the dimensions of the transponder, imbedded into medium 110, or is even made smaller, so that the necessarily well defined allocation of the antenna to the transponder is given during the printing process.

[0028] As already described above, it is preferred to arrange the antenna 122 in front of the printer 102 in order to provide a quality control of the transponder label prior to printing. Defect labels can be marked with a corresponding printout, or not being printed on at all, for instance.

[0029] In order to ensure a proper production the transponder label has to be placed individually in the domain of the antenna during the encoding process, and in case that such an antenna placement is not possible due to limited building space in the band (belt) guide, such a separation can be ensured by taking steps to shield it.

[0030] According to the present invention the electronics concerning the transponder-read/write device 103, 122 can be realized in the simplest case as a one-platinum solution (Einplatinenlösung), while the necessary power supply is provided by the existing power supply in the printer.

[0031] In case of another preferred design example the antenna 122 is made as a flexible, flat building block, in order to facilitate the integration even at bent band (belt) guides.

[0032] The data for writing (encoding) the transponder can be read into the printer device from a main computer (PC) via the common printer junction 126, and the printer control 124 delivers those data to device 104. Since the data for encoding the transponder is not necessarily printed, according to an additional design example the ESC sequence (ESC = ESCAPE) of printer driver protocols is expanded in order to carry out a selection of data to be printed and to be encoded.

[0033] For the case described above in which the printer control 124 does not take over the distribution of printer data and data for the transport, the transponder-read/write-device can be equipped in such a way that it is capable itself of filtering the required data from a data stream from the printer junction 126.

#### **Patent claims**

1. Device for printing onto a medium (110), having a sending- and/or receiving device, with
  - a printer (102), which prints onto medium (110) depending on the received printer data; and
  - a write- and/or read-device (104), able to communicate with the sending-and/or receiving device in the medium (110).

2. Device according to claim 1, with
  - a reservoir device (108) for the medium (110) ; and
  - a junction( 126) for receiving and sending data.
3. A device according to claims 1 or 2, where the write- and/or read-device (104) is placed between the printer (102) and the reservoir (108).
4. A device according to claims 1 or 2, where the write- and/or read device (104) is placed between the exit of the printer (102) and the printer (102).
5. A device according to claims 2 to 4, where the junction (126) receives and/or sends data for and data from the printer (102) as well as data for and data from the write- and/or read device.
6. A device according to one of claims 2 to 4, where the junction receives or sends printer data for – and data from the printer (102), while the write- and/or read device (104) contains an additional junction for receiving and sending of data to and from the write- and/or read device (104).
7. A device according to one of claims 1 to 6, where the write- and/or read device (104) contains an antenna (122), that is placed next to the medium (110).
8. A device according to one of claims 1 to 7, where the medium (110) is formed by two layers (118, 120), which are separable combined with each other, where the first layer contains a printable surface and a transponder, and where the second layer contains a carrier material.